

Top 10 Inexpensive Interventions to Help Farmers in Nepal After the 2015 Earthquake (**URGENT**)



Brief report for the Canadian Department of Foreign Affairs, Trade and Development (DFATD)

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1. Executive Summary

As witnessed in Haiti, a natural calamity can cause a secondary, long-term disaster in rural areas, which is often overlooked. In the case of Nepal, the pre-monsoon rains have started: due to widespread structural collapses, precious seeds that are stored in homes or mud granaries are becoming wet, causing the loss of livelihoods and generations of knowledge. Livestock were killed or are now being exposed to the elements – if they become sick, the only source of labour and fertilizers (manure) will be lost. Indeed, human and livestock injuries have reduced critical labour required for agriculture -- thus labour-saving technologies are needed urgently to ensure a sustained harvest this year. An influx of family members from urban areas will cause food stocks to be consumed rapidly, and hence early-to-mature crop varieties must be planted, to ensure food availability in 35-45 days – and as a guarantee that planting seeds will not be consumed as occurred in Haiti. There are obvious emergency interventions required (e.g. shelter) but the clever selection of materials can ensure that expensive products that might otherwise be discarded can be re-purposed to improve longer-term farm productivity.

This report prioritizes the following 10 high-impact interventions:

Product	Purpose	Cost/Family
Emergency needs (Immediate)		
Rolls of agricultural grade plastic	Inexpensive shelter for humans, cattle & seeds, for later re-purposing to construct a greenhouse or use as groundcover to suppress weeds	\$19.10 CAD \$15.80 USD
Low oxygen grain storage bag	To protect seeds from monsoon rains & prevent losses due to molds and insects	\$1.20 CAD \$0.99 USD
Water-proof gardening gloves	To clear debris and later re-purpose for farm work to reduce female hardship	\$0.60 CAD \$0.50 USD
Foldable military shovel	To clear debris and can be re-purposed for agricultural needs	\$3.60 CAD \$3.00 USD
First aid kit	Frontline care, and to reduce infections which would otherwise cause declines in farm labour	\$2.40 CAD \$2.00 USD
Medium-term needs (1-4 months)		
Seed package of rapid maturing grain/starch crop	To allow farmers to produce calories rapidly, and prevent consumption of sowing seeds	\$2.10 CAD \$1.75 USD
Seed package of rapid maturing beans (legumes)	To allow farmers to produce protein rapidly, and prevent consumption of sowing seeds	\$1.80 CAD \$1.50 USD
Seed package of rapid maturing vegetables	To allow farmers to produce vitamins and minerals (micronutrients) rapidly, especially required for pregnant women and children	\$1.80 CAD \$1.50 USD
Bag of nitrogen fertilizer (5 kg)	An inexpensive method to promote an immediate increase in food production within 3 months	\$2.40 CAD \$2.00 USD
Low cost tool package	To mitigate losses in farm labour caused by death/injury to humans and livestock	\$12.00 CAD \$10.00 USD
Kit cost for a household of 5 people	However, even a single one of the above products will be beneficial	\$47.00 CAD \$39.00 USD
Total cost for 100,000 people	For 100,000 people (20,000 households): \$940,000 CAD or \$780,000 USD (+ transportation, estimated \$2 million CAD)	

Continued.....

Each product is to be accompanied by an illustration(s) to ensure that beneficiaries, including illiterate people, understand and maximize each product (see samples in Appendix, complete and updated images will be downloadable for free online, visit www.SAKNepal.org). This approach will allow communication with remote villages where the only interaction might otherwise be limited to dropping supplies by helicopter. The products were chosen because they are: needed, inexpensive, light weight, can be procured rapidly in large numbers, and are multi-use -- providing households with flexibility (e.g. not every household needs a tent). The entire package of interventions constitutes an emergency Sustainable Agriculture Kit (eSAK), building upon our current pre-earthquake project to scale up SAKs to 100,000 people in rural Nepal. This kit approach is like a restaurant menu, from which any particular household can select a subset of products based on need – and similarly the Canadian government or other stakeholders may only wish to focus on one item for distribution based on their own constraints.

An important note is that several of the products recommended are based on extensive participatory needs-based surveys conducted pre-earthquake with farmers in the Kaski and Dhading districts of Nepal -- areas affected by the earthquake. Participatory approaches are similarly encouraged in this aid effort. In addition, the strategies in this report are intended to preserve local farmer seed landraces, or encourage the use of seed varieties that have already been approved for release in Nepal. External seeds may displace local biodiversity which may otherwise promotes resiliency, and cause loss to generations of associated indigenous knowledge on when/how to use these seeds.

This report is brief – essentially 10 summary tables. For each product, the precise cost, number of units and procurement strategy is described. Aid efforts should procure locally first if possible but as short-term prices will likely spike, then external procurement has been suggested, but only for the short term. In general, we recommend procuring products inexpensively via the wholesale online marketplace, Alibaba.com, which in our opinion has untapped potential in these circumstances. Stakeholders such as DFATD will need to ship products into Kathmandu (e.g. by military transport), but from there, we recommend hiring local dealers who sell snackfoods, alcohol and cigarettes to rural areas. It is possible to buy such goods today in even the most remote villages. This distribution strategy is part of the SAK approach, and we have started to use this network already in Nepal. Finally, though we are generally not in favour of handouts, this emergency dictates free distribution in many circumstances. However to ensure rapid scaling up, we also encourage the private sector to sell these products, which are priced at the correct economy of scale for rural Nepalese.

We hope that NGOs, governments and the private sector will benefit from the following recommendations to help Nepalese farmers avoid a prolonged crisis. In summary, we recommend a dedicated relief fund to help Nepalese farmers.

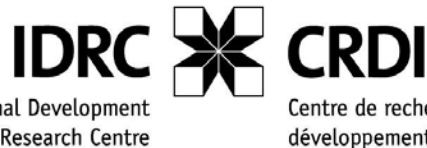


About the SAKNepal Project and the Impetus for this Report

The Sustainable Agriculture Kit project for Nepal (SAKNepal) is a \$2.3 million (Cdn) project funded by the Canadian International Food Security Research Fund (CIFSRF), jointly sponsored by the International Development Research Centre (IDRC, Ottawa) and the Canadian Department of Foreign Affairs, Trade and Development (DFATD). The project aims to scale up low cost commercial products to help farmers in Nepal, with a focus on reducing female drudgery. The project is an ongoing collaboration between the University of Guelph, the Canadian Mennonite University, the grassroots Nepalese NGO LI-BIRD ([www.Libird.org](http://www.libird.org)), and their spin-off seed company, Anamolbiu. LI-BIRD (Local Initiatives for Biodiversity, Research and Development) is located in Pokhara, Nepal, and they have 20 years of experience working with farmers including districts affected by the earthquake. LI-BIRD is providing reports to the Canadian team on the needs of rural households even in the most remote villages. Two of the authors of this report (TC and KK) are of Nepalese origin and have worked extensively with Nepalese farmers in the region, while MNR has worked in Nepal in collaboration with LI-BIRD since 2010. All current SAKNepal projects are adjacent to the earthquake epicenter. For these reasons, this report was undertaken to provide guidance to generous relief efforts by the Government of Canada. The authors thank everyone who contributed to this report in Canada and Nepal.

For updates on relief efforts being undertaken by LI-BIRD, visit:
http://www.libird.org/app/news/view.aspx?record_id=23

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2. Top 5 products to help rural households with immediate, emergency needs

2.1. Inexpensive shelter using agricultural grade plastic for later re-purposing to construct a greenhouse or use as groundcover to suppress weeds	
Timespan	Immediate, short -term
Concept	Agricultural grade rolls of plastic are inexpensive, durable, light weight, can be used to construct shelters then re-purposed to improve farm productivity.
eSAK Product(s)	<p><u>Per household, shelter kit:</u></p> <ul style="list-style-type: none"> • 6m wide x 15m long roll of inexpensive clear agricultural plastic mulch or greenhouse plastic film or semi-clear greenhouse tarpaulin • 2 rolls of water-proof duct tape • 1 razor blade • optional: opaque, blue/green/red tarpaulin for use as shade, privacy and as secondary protection against monsoon rains • optional: durable plastic rope (to tie shelters) <p>Pictures:</p> <ul style="list-style-type: none"> • agricultural plastic mulch: http://www.alibaba.com/product-detail/Good-quality-plastic-mulch_1745747290.html • greenhouse film: http://www.alibaba.com/product-detail/Long-lifetime-greenhouse-cover-film_504002896.html • greenhouse tarpaulin: http://www.alibaba.com/product-detail/waterproof-sunproof-transparent-tarpaulin-for-soil_2017378637.html • duct tape: http://www.alibaba.com/product-detail/UV-Resistant-Lead-Free-Professional-Grade_60011169367.html • razor blade: http://www.alibaba.com/product-detail/Single-Edge-Razor-Blades_452773794.html
Rural Need(s)	<ul style="list-style-type: none"> • allow people to make their own tents using local wood as poles, wrapped around as a single piece to make it water proofed. • various shelter designs will be explained using the accompanying eSAK Picture Booklet (including use of the terrace wall). • for <u>animal shelters</u> • to temporarily <u>replace collapsed roofs</u> • to create covered <u>cooking area</u> • to cover and <u>protect food</u> • to cover and <u>protect vulnerable long-term seed stocks</u> • side or roof of tent can be modified for <u>rainwater harvesting</u> since nearing start of monsoon season. • can be used as a water-proof splint for injuries during monsoon • can be used to protect open wounds from water <p><u>Later can be repurposed as a greenhouse during the cold season, or to protect high value vegetables against insects, or as a groundcover to suppress weeds.</u></p> <p>**If it is decided that solely procuring opaque plastic is more practical, it can still be re-purposed as a groundcover to suppress weeds, or for a shade house to protect low-light seedlings including high value vegetables.</p>

Notes	<ul style="list-style-type: none"> • should be accompanied by the relevant eSAK picture booklet. • there would be concern about over-heating; so it should be set up in the shade or covered with a darker tarpaulin (as noted above). • material is inexpensive and easily procured in large quantities. • the concept of providing a roll of light weight plastic sheeting is to provide maximum flexibility to rural households to meet their various needs. Unlike a tent, this is multipurpose, and can be repurposed to improve farm productivity.
Weight + Logistics	<ul style="list-style-type: none"> • light weight • for a few households, can be carried by a single person, or by motorcycle. • alternatively, a single large roll can be dropped into a village by helicopter along with the eSAK instructional booklet (see Appendix).
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha SAKNepal Priority District: Dhading
Numbers Required	<ul style="list-style-type: none"> • Up to 370,000 units including urban areas. Rural areas would be some fraction of this. • Nepal Information Minister Dr. Minendra Rijal said Nepal would need 400,000 tents and so far has been able to provide only 29,000 to those in need. <p>Source: http://www.thestar.com/news/world/2015/05/02/a-week-after-nepal-quake-anger-grows-as-residents-wait-for-aid.html</p>
Procurement	<ul style="list-style-type: none"> • inexpensive if purchased in bulk, sold by ton weight. • procure locally first, to promote local industry • available in Canada, but likely cheaper from China, and available in large quantities by ordering from Alibaba.com: <p>Search Alibaba.com for “plastic mulch” or “mulch film”: http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=plastic+mulch</p> <p>Search Alibaba.com for “greenhouse film” http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=greenhouse+film</p> <p>Search Alibaba.com for “greenhouse tarpaulin” http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=greenhouse+tarpaulin</p> <p>Search Alibaba.com for “duct tape” http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=duct+tape</p> <p>Search Alibaba.com for “razor blade” http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=razor+blade</p> <p>Search Alibaba.com for “plastic rope” http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=plastic+rope</p>
Estimated cost (not including transport)	<p>**Note this cost can be scaled down as needed to provide minimal shelter**</p> <p><u>Per household: \$19.10 Cdn (\$15.80 USD):</u></p> <ul style="list-style-type: none"> • clear plastic roll: \$.25 Cdn/m² x 60 m² = \$15.00 Cdn • darker shading sheet: \$0.25 Cdn/m² x 12 m² = \$3.00 Cdn • 2 rolls of duct tape: \$0.50/Cdn per roll x 2 rolls = \$1.00 Cdn • 1 razor blade: \$0.10 Cdn <p><u>Per 1,000 households: \$19,100 Cdn (\$15,800 USD)</u></p> <p><u>For 100,000 households: \$1.91 million Cdn (\$1.580 million USD)</u></p>

2.2. Hermetic grain storage bag

Timespan	Immediate, short-term
Concept	<p>As structures have collapsed, rain is damaging food normally stored within homes or mud granaries, including generations-old precious seed stocks that must be protected. If the seeds are damaged, farmer livelihoods in remote areas will collapse.</p> <p>A hermetic storage bag consists of a thick 3-layered plastic that allows oxygen to flow out, but not back in, thus preventing fungus or insects from damaging stored grain. Some bags have a zipper to prevent water damage. It is very inexpensive.</p> <p>This product was already being planned for scaling up by the SAKNepal project as Nepalese farmers suffer from 10-50% losses in grain during traditional storage.</p> <p>The cost:benefit ratio of this product is likely 1:50</p>
eSAK Product(s)	<p>Per household:</p> <ul style="list-style-type: none"> • 1-3 Grainpro SGB I or rSGB III™ (72 x 100 cm) bags with or without zipper • alternative: Purdue Improved Cowpea Storage System (PICS 2) Bags
Rural Need(s)	Protection of food and seeds including community seeds from the Monsoon rains
Notes	<p>Should be accompanied by the relevant eSAK illustration on how to use.</p> <p>A secondary container can be useful, as can raising the bag above ground.</p>
Weight + Logistics	<p>Garbage-bag size light weight bag, foldable (0.15 kg/bag). Can be easily carried into a village, or large numbers can be dropped in a bundle by helicopter into a village.</p> <p>Grainpro will ship from India within 1 week and truck from India.</p>
Priority Districts	<p>Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha</p> <p>SAKNepal Priority District: Dhading</p>
Numbers Required	Same as number of rural households that have collapsed buildings: Minimal number (to start) would be 20,000+ units for region to assist 100,000 people.
Procurement	<p>Grainpro, Massachusetts, USA (CEO: Mr. Phillippe Villers) 200 Baker Ave., Suite 309 Concord, MA 01742 USA Tel:+1 978 371 7118 Fax:+1 978 371 7411 E-mail: sales@grainpro.com Order online: http://shop.grainpro.com/</p> <p><u>South Asia office of Grainpro:</u> Avinash Ramchandra Wagh Continent Manager Mobile: +91 9970157263 Email: avinash@grainpro.com Nepal distributor: Nepal Mero Agro (but may not have the best price)</p>
Estimated cost	<p>Per household:</p> <ul style="list-style-type: none"> • OPTION 1: per bag, Superbag Farm I (no zipper, 75 x 130 cm) – \$1.20 CAD (\$0.99 USD) for min 10,000 bags which includes shipping from Mumbai (special rate from CEO of GrainPro, Mr. P.Villers). • OPTION 2: per bag: Superbag III™ (72 x 100 cm) with Improved Zipper Slider - \$2.12 Cdn (\$1.75 USD) for >5000 bag order (transportation extra). • speak directly to the President of the Company, P. Villers, for special cost and transportation arrangements (pvillers@grainpro.com).

2.3. Gardening gloves to clear debris and later re-purpose for farmwork to reduce female hardship	
Timespan	Immediate, short-term
Concept	Brick, stone and mud debris is being cleared by hand, which will become even more difficult in the rain. Simple water-resistant gardening gloves will prevent injury and can be re-purposed to help men and especially women in their manual farm-labour tasks to reduce hardship (e.g. collecting wood, removing weeds, working with plough, etc). Such gloves are not currently used by rural Nepalese farmers and represent a simple intervention. This was already being scaled up in 2015 as part of the SAKNepal project to reduce female hardship in rural areas, and to permit improved labour productivity.
eSAK Product(s)	<u>Per household:</u> • 2 sets of low cost water-resistant gardening gloves
Rural Need(s)	Reduce damage to hands, and improve human productivity in debris removal and reconstruction process, for repurposing to agriculture.
Notes	Should be accompanied by the relevant eSAK illustration to show the various uses of these gloves.
Weight + Logistics	Very light weight and compact. Can be easily carried into a village, or large numbers can be dropped in a bundle by helicopter into a village. Can be easily placed on a Canadian military transport plane.
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha SAKNepal Priority District: Dhading
Numbers Required	Same as number of rural households that have collapsed buildings: Minimal number (to start) would be 20,000+ units for region to assist 100,000 people.
Procurement	<ul style="list-style-type: none"> • procure locally first, to promote local industry • Many options can be procured inexpensively from China: search Alibaba.com for “gardening glove”: http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=gardening+glove
Estimated cost (not including transportation)	<u>Per household:</u> <ul style="list-style-type: none"> • \$0.60 Cdn per set (\$0.50 USD) • 2 sets per household = \$1.20 Cdn (\$1.00 USD) (recommended) Per 1,000 households x 2 sets: \$1200 Cdn (\$1000 USD)

2.4. Multipurpose, light-weight shovel that folds: the military trenching shovel that can be re-purposed for agricultural needs	
Timespan	Immediate, short-term
Concept	A shovel is needed to clear debris, which can then be re-purposed to reduce hardship in agriculture. This is a multi-purpose tool (shovel, wood saw, etc.) that is light weight, inexpensive, folds to be compact for transport, and can be procured rapidly on a large scale. It is widely used by the Canadian army and many armies around the world.
eSAK Product(s)	<ul style="list-style-type: none"> • military folding, trenching shovel: • picture: http://modernsurvivalblog.com/wp-content/uploads/2014/12/military-trench-shovel.jpg
Rural Need(s)	<ul style="list-style-type: none"> • shovel to clear debris from collapsed structures and for future re-building, rather than using hands. • shovel to dig holes for poles during tent construction. • serrated edge is designed for cutting wood (e.g. for poles during tent construction). • can be re-purposed later for use in farming tasks.
Notes	Should be accompanied by the relevant eSAK illustration.
Weight + Logistics	<p>Foldable, light-weight so easy to transport.</p> <p>NATO army personnel and Chinese Army Personnel are all issued this shovel to carry in their backpacks. Hence, it will be a familiar product to transport by Canadian Military Transport into Nepal. It can then be delivered by walking or dropped by helicopter.</p>
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha SAKNepal Priority District: Dhading
Numbers Required	1 shovel can be shared between 2-3 households: Minimal number (to start) would be 5,000+ units for region to assist 75,000 people.
Procurement	Search Alibaba for "Military shovel" http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=military+shovel
Estimated cost (not including transportation)	<p>Per unit from Alibaba: \$3.60 Cdn (\$3 USD) -- but can be shared amongst 3 households (hence \$1.20 Cdn (\$1 USD) per household).</p> <p>Per 1000 households, assuming shared amongst 3 households: \$1080 Cdn (\$900 USD).</p>

2.5. First aid kit	
Timespan	Immediate, short term
Concept	Though not a direct agricultural intervention, a first aid kit will prevent infections, especially to small wounds suffered during the earthquake or during debris clearing. It does not replace access to medical care, but it is an inexpensive low cost frontline intervention. If farmers get infections, agricultural productivity will decline.
eSAK Product(s)	<u>Per household:</u> First aid kits (including large and small bandages, topical antibiotics, topical alcohol cleaning pads, Dettol, anti-diarrhea supplements).
Rural Need(s)	Surface wounds, preventing infections
Notes	Kit should be accompanied by eSAK picture illustration to explain that wound should be cleaned first, treated with antibiotic or alcohol, and then covered with bandage.
Weight + Logistics	Light weight, easy to drop by helicopter or transport on foot.
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha SAKNepal Priority District: Dhading
Numbers Required	Can be shared between 2 households: Minimal number (to start) would be 10,000+ units for region to assist 100,000 people.
Procurement	<ul style="list-style-type: none"> • procure locally first, to promote local companies • Alibaba.com from China: http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=first+aid+kit
Estimated cost (not including transportation)	Per 2 households: \$2.40 Cdn (\$2.00 USD) Per 1000 households: \$2400 Cdn (\$2,000 Cdn)

3.6. Top 5 additional short-term recommendations for catastrophic situations
where nothing is accessible after a home has collapsed or buried in a landslide.

1. **Short term food** support to households. **Canada is a leading exporter of two food products most consumed by Nepalese: wheat and lentils** (+ other pulses) which can be procured from Western Canada. An ideal food package would consist of lentils, wheat and purchased rice (+ salt to allow faster cooking at higher altitudes). Rice and lentils are small grains that cook rapidly, including at higher altitudes, and lentils are high in iron and other micronutrients critical for pregnant women and children.
2. **Cooking utensils**: cooking pot, cooking ladle, small metal grate or pan to cook flatbread, and 5 metal plates or bowls per household. See Alibaba.com or local dealers in Nepal or India for procurement.
3. **Jerry-cans and jugs for drinking water**. See Alibaba.com for procurement.
4. **Sleeping: blankets and inexpensive sleeping mats**. See Alibaba.com.
5. **Clothing including baby clothing including raincoats to combat the Monsoon rains.**

Finally, we recommend direct financial support for subsistence families with casualties, in partnership with local grassroots organizations and farmer groups: 20,000 NPR (i.e., 250 CAD) per person to cover the cost of cremation, and mourning rituals.

3. Top 5 products to assist with medium-term needs (1-4 months)

3.1. Rapid maturing (short duration) variety seed packages to prevent hunger: starch/calorie sources	
Timespan	Medium, 3-4 months
Concept	<ul style="list-style-type: none"> • farmers may have lost all seeds if seeds stored inside a house that collapsed, or if the seeds have become wet. • seeds of early duration crop varieties for farmers to sow, to ensure they begin to produce food for themselves rapidly, in this case a good source of calories. • these crops are also chosen because they are compatible with the current season in this region of Nepal.
eSAK Product(s)	<ul style="list-style-type: none"> • local maize variety 'Arun-2', if the farmers have not planted yet, which produces grain in 90 days after sowing. • maize varieties- 'Rampur Composite' and 'Resunga Composite' if not too late.
Rural Need(s)	Starch/calories within 3-4 months
Notes	<ul style="list-style-type: none"> • yam is labour intensive to dig out at harvest, but we have a SAK illustration which shows that yam can be grown in simple bags that can be stacked along the terrace wall, which will make harvesting much easier and utilize the otherwise wasted terrace wall surface area. • the SAKNepal project has enough planting materials for the project farmers itself but not for scaling up. • if improved maize varieties are not available locally, then seeds should be obtained from the Indian and Chinese ministries of agriculture, and the private sector, for compatible agro-climatic conditions.
Weight + Logistics	<ul style="list-style-type: none"> • maize – light weight seed packages, however, there must be seed already available; can be dropped by helicopter or walked in. • yam (problem is that this is not planted from seeds but from pieces of tuber so difficult to scale up, but priority should be given to finding local sources rapidly or in neighboring countries).
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dokakha SAKNepal Priority District: Dhading
Numbers Required	As much as possible
Procurement	<ul style="list-style-type: none"> • Anamolbiu in Nepal • Nepal Agricultural Research Council (NARC) • private sector in Nepal • farmers in the least affected districts may be sources for yam
Estimated cost (not including transportation)	Inexpensive, in general \$2.10 Cdn (\$1.75 USD) per household for maize (for small package).

3.2. Rapid maturing (short duration) short duration variety seed packages to prevent hunger: protein sources	
Timespan	Medium, 1-4 months
Concept	<ul style="list-style-type: none"> farmers may have lost all seeds if seeds stored inside a house that collapsed, or if the seeds have become wet. seeds of early duration crop varieties for farmers to sow, to ensure they begin to produce food for themselves rapidly, in this case a good source of protein. these crops are also chosen because they are compatible with the current season in this region of Nepal.
eSAK Product(s)	<p>As seed for any one crop will be limited, we have provided a menu of options such that a household receives at least one protein option:</p> <ul style="list-style-type: none"> packages of seeds for cowpea (varieties 'Aakash' and 'Prakash' for lower altitude only, 'Malepatan-1') which can start producing food within 30-35 days. packages of seeds for early maturing black gram – 'Kalu'. packages of seeds for bushy type, early maturing snap bean – 'Contender', 'Giant Stringless' (first picking in 50-55 days, can have multiple harvests during the next 2-3 months). packages of seeds for early maturing ricebean - Local. packages of seeds for early maturing horsegram – Local. packages of seeds for early maturing soybean eaten for its green pods within 90 days (e.g. variety 'Puja', 'Huaichin # 2', 'Suaidachung', etc). packages of perennial legume pigeon pea – 'Bageshwari', 'Rampur Rahar-1'. winged bean/asparagus bean (<i>Psophocarpus tetragonolobus</i>) – 1 plant is enough for a family – it can climb up the terrace wall if planted at the base – can start to consume within 25-35 days, keeps regenerating from tuber, so no need to re-seed, seeds have high nutritional quality. packages of long-bean seeds ('tane bodi'): 'Sarlahi Tane', 'Khumal Tane'
Rural Need(s)	Protein within 3-4 months
Notes	<ul style="list-style-type: none"> the SAKNepal project may have enough planting materials for the project farmers itself but likely not for scaling up. if local varieties are not available, then seeds should be obtained from the Indian and Chinese ministries of agriculture, and the private sector, for compatible agro-climatic conditions. the legumes will enrich the soil with organic forms of nitrogen, thus reducing the longer term fertilizer requirement for other crops. accompanied by an illustration which demonstrates that some of these legumes can be planted at terrace edges or at the base of the terrace wall, and then either climb up or fall down, to take advantage of the terrace wall surface area which is underutilized. These illustrations are already available for printing and downloading from the SAKNepal website.
Weight + Logistics	Light weight seed packages, however, there must be seed already available; can be dropped by helicopter or walked in.
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha SAKNepal Priority District: Dhading
Numbers Required	As much as possible
Procurement	<ul style="list-style-type: none"> Anamolbiu in Nepal Nepal Agricultural Research Council (NARC) private sector in Nepal
Estimated cost (not including transportation)	Inexpensive, in general \$1.80 Cdn (\$1.50 USD) per household for seeds (small package).

3.3. Rapid maturing (short duration) short duration variety seed packages to prevent hunger: micronutrient sources (vegetables)	
Timespan	Medium, 1-4 months
Concept	<ul style="list-style-type: none"> farmers may have lost all seeds if seeds stored inside a house that collapsed, or if the seeds have become wet. seeds of early duration crop varieties for farmers to sow, to ensure they begin to produce food for themselves rapidly, in this case a good source of critical micronutrients (vitamins and minerals). these crops are also chosen because they are compatible with the current season in this region of Nepal.
eSAK Product(s)	<p><u>As seed for any one crop will be limited, we have provided a menu of options such that a household receives at least one micronutrient source:</u></p> <ul style="list-style-type: none"> packages of seeds of tomato – ‘Roma’ and ‘Pusa Early Dwarf’ (very early), ‘Pusa Ruby’ (early), ‘Srijana’ (70-80 days). packages of seeds of okra – ‘Pusa Sawani’, Arka Anamika (early), Local. packages of seeds of eggplant – ‘Pusa Purple Long’, ‘Pusa Kranti’. packages of seeds of local Cucurbits (Sponge Gourd – ‘Pusa Chikni’, ‘Kathmandu Local’; Zucchini – ‘Grey Zucchini’, ‘Black Zucchini’, ‘Black Beauty’; Cucumber – ‘Japanese Long Green’ (extra early), ‘Bhaktapur Local’; Pumpkin – <i>C. moschata</i>, <i>C. maxima</i>, <i>C. pepo</i>; Bottle Gourd – ‘Pusa Summer Prolific Long’, etc.). packages of seeds for chayote (a gourd, <i>Sechium edule</i>) which produces fruits also called <i>vegetable pear</i> are eaten cooked like potatoes, tubers and shoot tips are also consumed as vegetables (only 2 plants per household produces a good food supply; high in folate, but low in carbohydrates, fat and protein). packages of short duration radish – ‘40 Days’.
Rural Need(s)	Food source including micronutrients within 1-2 months
Notes	Chayote can be grown along the terrace wall to utilize this surface area, which is a SAK intervention (should be accompanied by an illustration which can be completed rapidly).
Weight + Logistics	<ul style="list-style-type: none"> light weight seed packages, however, there must be seed already available; can be dropped by helicopter or walked in. can be distributed as a home garden kit, which is the expertise of Anamolbiu, and they have thousands of seed packages available.
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha SAKNepal Priority District: Dhading
Numbers Required	As much as possible
Procurement	<ul style="list-style-type: none"> Anamolbiu in Nepal Nepal Agricultural Research Council (NARC) private sector
Estimated cost (not including transportation)	Inexpensive, in general \$1.80 Cdn (\$1.50 USD) per household for seeds (small package).

3.4. Small bags of nitrogen fertilizer (urea)	
Timespan	Medium, 1-4 months
Concept	Even a small bag of nitrogen fertilizer is likely to raise crop yields rapidly, especially of maize which has mostly been planted in the region.
eSAK Product(s)	5-10 kg/household of urea fertilizer per household
Rural Need(s)	Short-term fertilizer
Notes	<ul style="list-style-type: none"> • add urea in maize at knee height stage. • should be accompanied by the appropriate SAK illustrations which show split applications and microdosing techniques to dramatically reduce the amount of fertilizer needed and prevent losses due to leaching, especially on sandy soil.
Weight + Logistics	5-10 kg per household, so heavy to carry into a village in large quantities, but a simple intervention guaranteed to have a positive impact. Thus, priority should be given to villages accessible by road.
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha SAKNepal Priority District: Dhading
Numbers Required	As much as possible
Procurement	<ul style="list-style-type: none"> • procure locally first, to promote local industry • can be procured from neighboring India/China via Alibaba.com (urea or diammonium phosphate DAP). • private Canadian fertilizer companies (Agrium or other) would be excellent Canadian sources for transport by military plane
Estimated cost (not including transportation)	\$2.40 CAD per 5 kg urea (\$2.00 USD)

3.5. Low cost tool package to mitigate losses in farm labour	
Timespan	Medium, 1-4 months
Concept	<ul style="list-style-type: none"> • inexpensive tools/equipment to reduce labour, especially needed if family tools have been lost due to building collapse. • there may be a shortage of labour due to death and injury of humans and livestock.
eSAK Product(s)	<ul style="list-style-type: none"> • Jab planter (adjustable for various seed sizes to permit planting of grains and legumes): can be shared by 2 households. • local digging tools: A set of: a spade (kodali) or hoe, rake with wooden handle, and sickle (cutting tools e.g. hasiya/karauti).
Rural Need(s)	To mitigate shortage of labour
Notes	<ul style="list-style-type: none"> • only the jab planter is foreign and should be accompanied by a SAK picture book illustration which is already available for printing. • Jab planter reduces labour required for planting seeds from 4 people + 2 cattle to a single person including a woman.
Weight + Logistics	Bulkier items
Priority Districts	Country: Gorkha, Dhading, Rasuwa, Nuwakot, Sindhupalchok, Dolakha SAKNepal Priority District: Dhading
Numbers Required	<ul style="list-style-type: none"> • 10,000 units to start for the earthquake region. • 100 Jab planters and 300 sets of local digging tools for the SAK project.
Procurement	<ul style="list-style-type: none"> • procure locally first if possible, to promote local industry • Jab planter can be procured from Alibaba.com – search “jab planter” or “maize planter” or “Hand planter” or “seeder”. • simple maize planter for \$4.00 USD. http://www.alibaba.com/product-detail/High-quality-hand-maize-planter-Skype_1729336906.html • multi-functional hand planter that fits different seeds (\$25.00 USD) http://zzwonderful.en.alibaba.com/product/60197647668-220824765/WDF_Manual_multi_functional_seeder_and_planter.html • hillside planter: http://www.alibaba.com/product-detail/small-hand-planting-machine_914794387.html • discounted if in bulk • other local tools should be acquired from local blacksmiths or similar functions from Alibaba.com to ensure that they are available rapidly.
Estimated cost (not including transportation)	<ul style="list-style-type: none"> • Jab planter: \$4.00-25.00 USD if purchased in bulk (\$5.00-\$30.00 Cdn) per planter. • other tool costs are not known but likely in the range of \$5.00 Cdn per tool shared between two households. • set aside budget of \$10.00 USD/\$12.00 Cdn per household.

3.6. Additional short-term recommendations for catastrophic situations

If animal feed/forage is not accessible after a home has collapsed or buried in a landslide, then the following intervention is recommended:

- seed packages for high nutrient forage grasses to feed livestock: vetch, white clover (variety: Pyauli), and oat (varieties: Parbati and Ganesh, recently released).

4. Long-term support to facilitate re-building

Long-term solutions will require strong participatory approaches to understand the needs of farmers. For these reasons, here only preliminary and simple suggestions are provided:

4.1. Long term financial support for re-building in case of catastrophic loss

1. Direct financial support (up to 10,000 NPR, i.e., 125 CAD per family) for households that have completely lost their homes, to help them to rebuild. We recommend partnerships with local grassroots partner organizations to assist with re-building.
2. Direct financial support (up to 4000 NPR, i.e., 50 CAD per family) to rebuild a livestock shed in the situation where the sheds have been demolished by the earthquake. The shed should be re-built to maximize manure and urine collection as sources of organic fertilizer (demonstrated in the SAK Picture Book, see below).
3. Direct financial support and/or direct gifts to restore households to a living bank of animals as follows: 2 cattle (expensive), 2 goats, 5 piglets and/or a brood of chickens if killed during the earthquake.

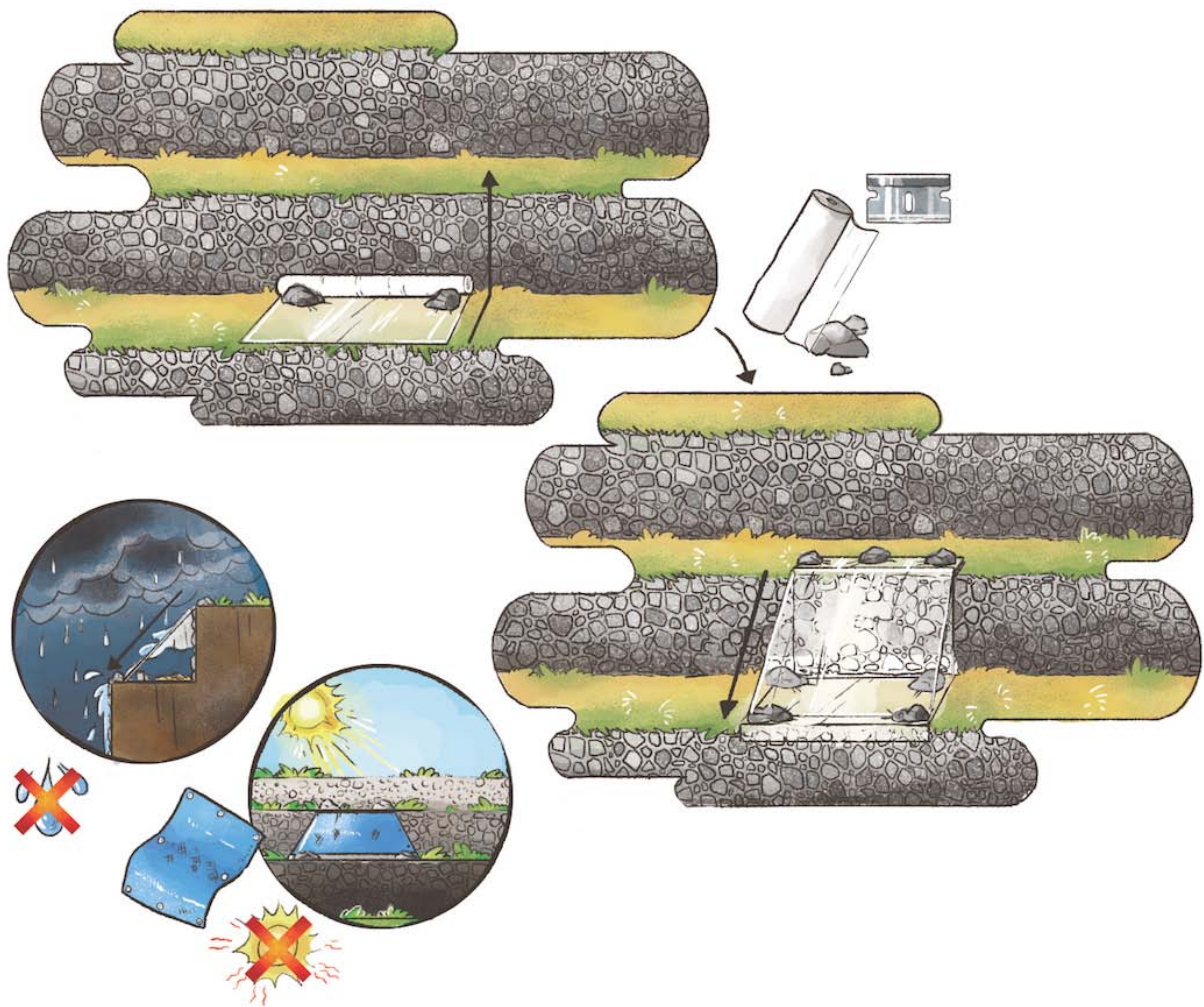
4.2. Specific long-term products or practices

1. We recommend scaling up the SAK Picture Book which describes 100+ improved farming practices currently intended for release in August 2015. It will also be available online for free to download and print. Though the book is currently ~50% complete, thought should be given to printing the first part now.
2. We must assess the long term needs in the coming months. In general, we recommend a package of up to 25 inexpensive interventions (products and practices), in partnership with the private sector, to assist terrace and hillside farmers in Nepal in order to improve productivity and decrease labour, which are especially now important. These interventions are currently being tested or scaled up in Nepal as part of the SAKNepal project.
3. For further details, please visit the SAKNepal website (www.SAKNepal.org). We will continuously upload guidance documents as they become available.

5. Appendix of example illustrations to accompany products

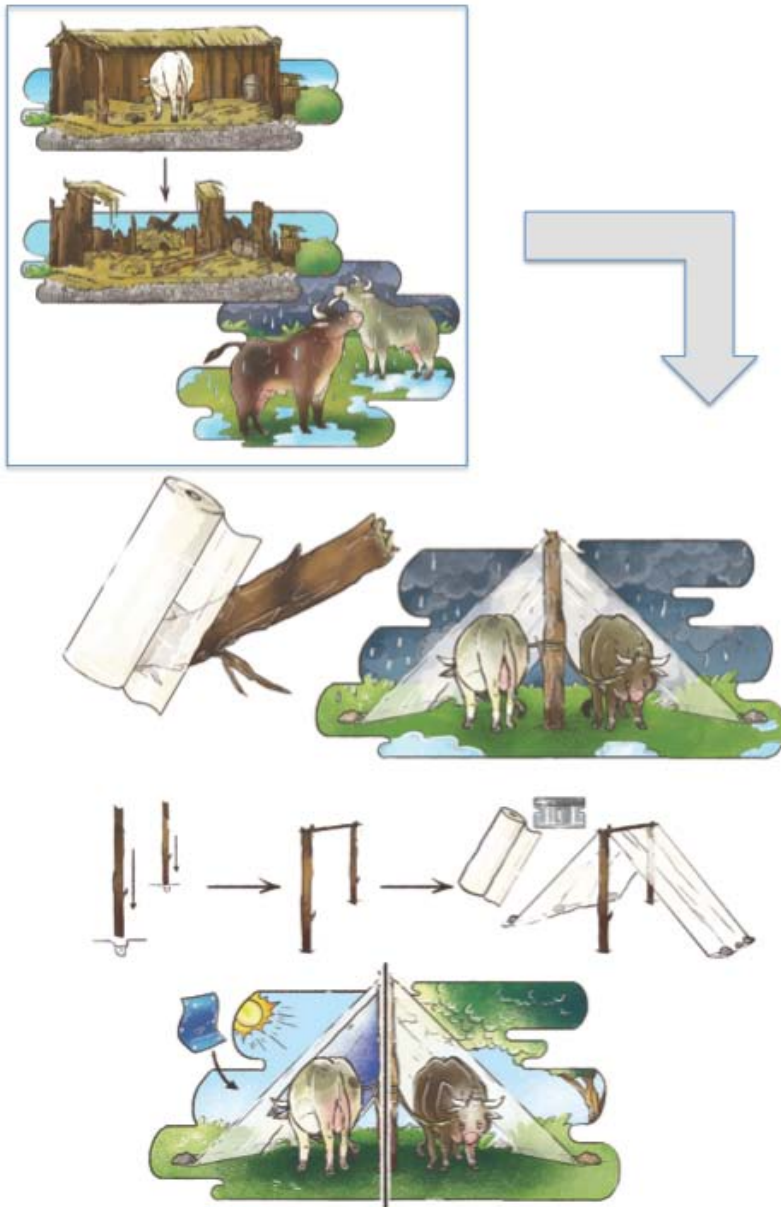
- approx. 50 SAK book illustrations are now available
- emergency illustrations (eSAK) will be available by May 10, 2015

eSAK illustration 1: How to create a tent rapidly from tarpaulin on terraces using the terrace wall, with a blue tarpaulin for shade. The advantage of this structure is that no wood is required. It is important to assemble this structure where water flow down the terrace is minimal or can be channelled away.



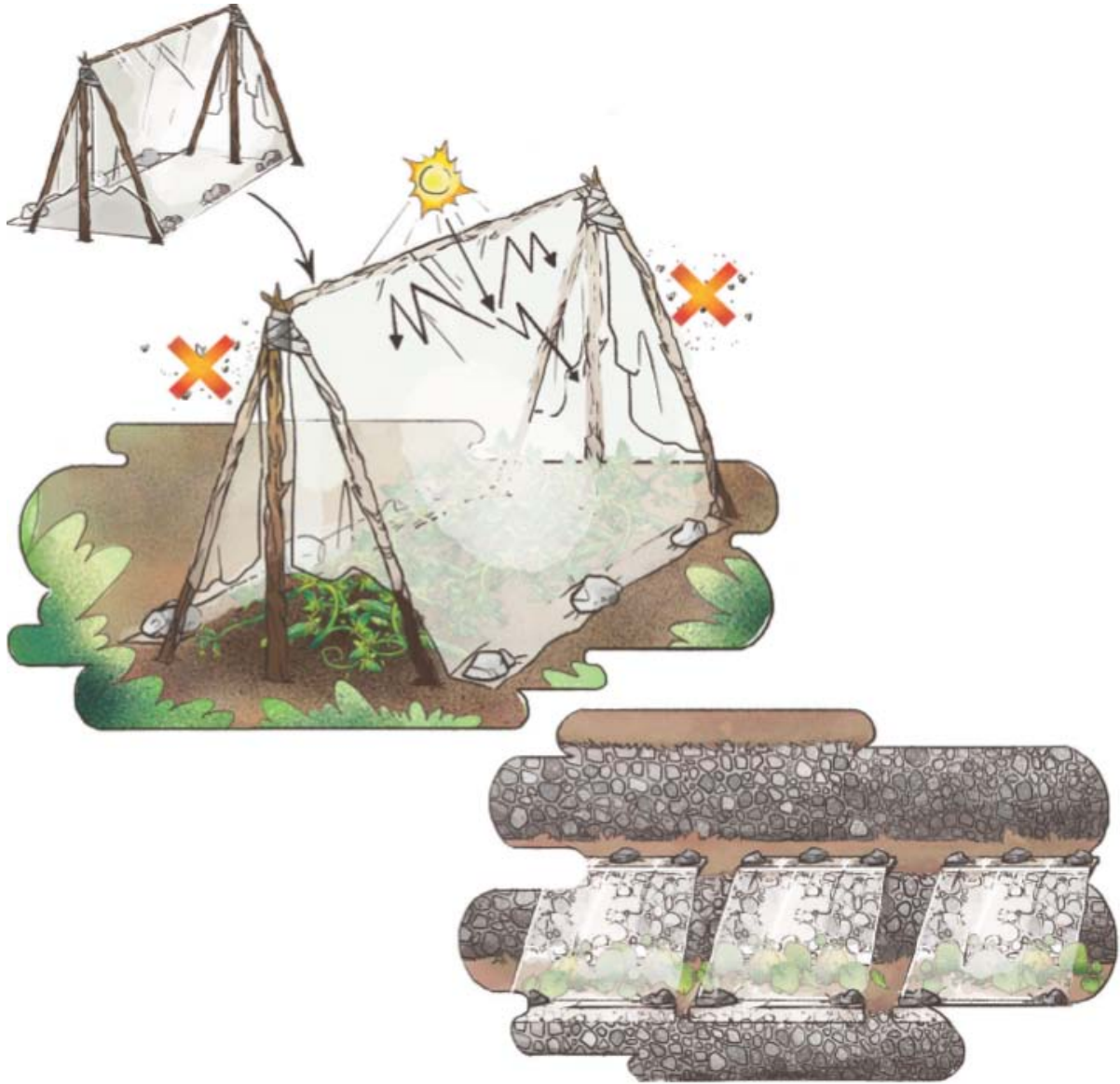
Source: Lisa Smith, SAKNepal Project Graphic Illustrator

eSAK illustration 2: Simple livestock shelter in the shade or with a dark tarpaulin.



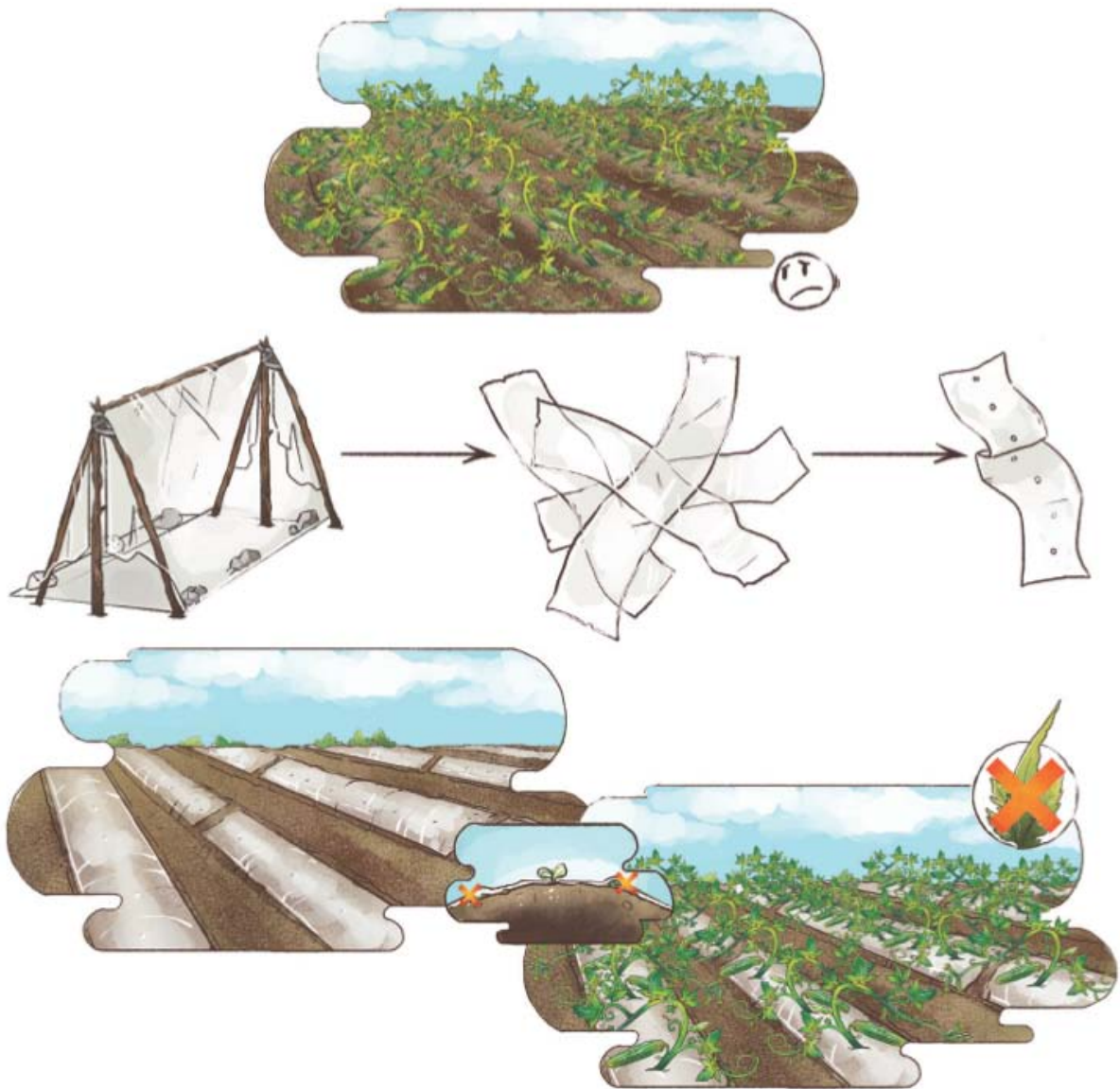
Source: Lisa Smith, SAKNepal Project Graphic Illustrator

eSAK illustration 3: A tent intended for humans can later be repurposed to a greenhouse in the cold season (if clear plastic) or as a shadehouse (if opaque plastic) in the pre-season for young seedlings prior to transplantation in the field. Again, no wood is required. It is important to assemble this structure where water flow down the terrace is minimal or can be channeled away.



Source: Lisa Smith, SAKNepal Project Graphic Illustrator

eSAK illustration 4: A tent intended for humans can later be repurposed as groundcover to suppress weeds in a home garden. The plastic can be clear or opaque, light or dark.



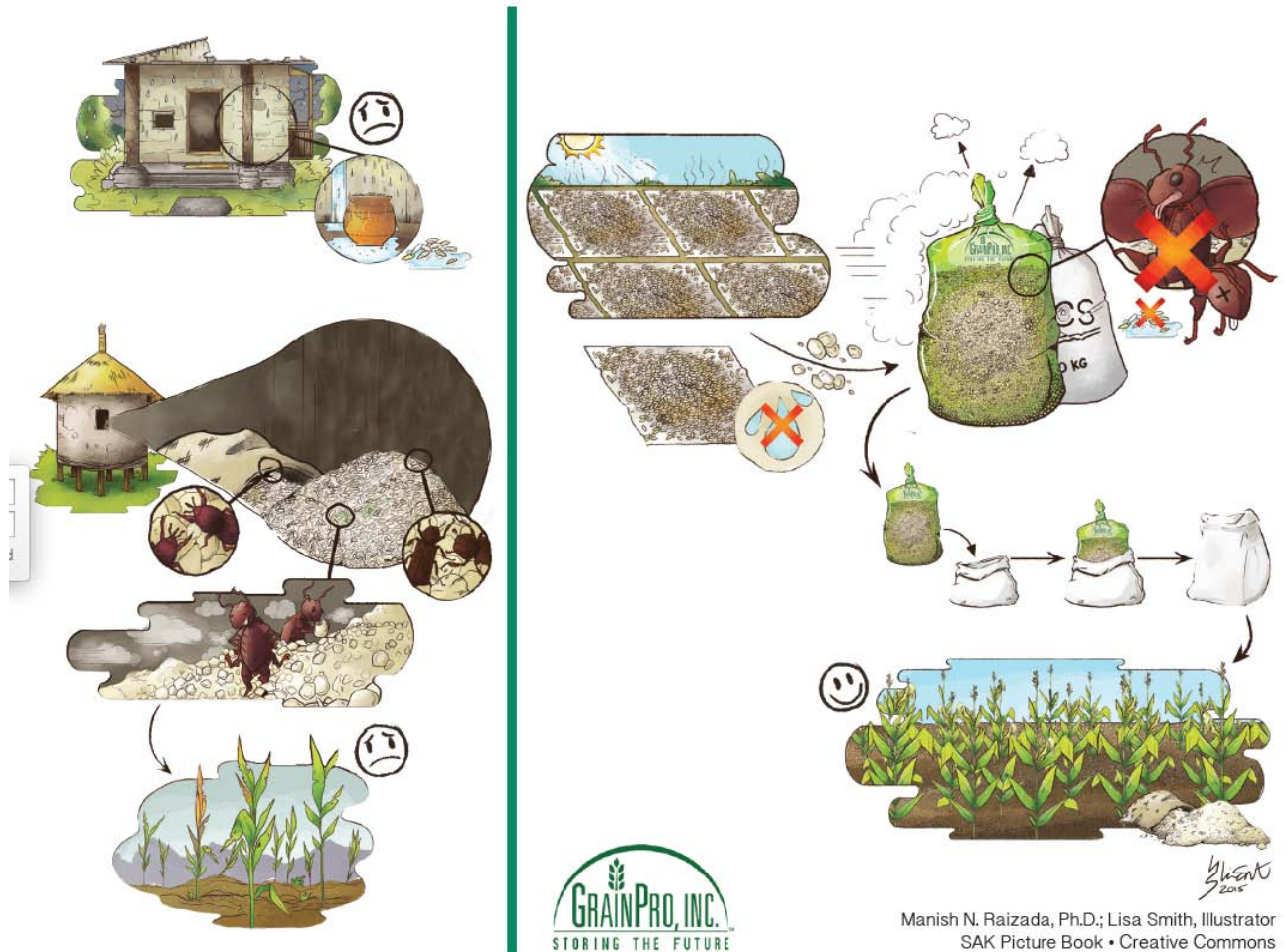
Source: Lisa Smith, SAKNepal Project Graphic Illustrator

eSAK illustration 5: How to use a jab planter (seeder) that reduces the labour required for planting seeds from 4 humans and 2 livestock, to a single person. This simple tool can help mitigate labour shortages caused by injury to humans and livestock, and increase farm productivity during normal conditions, especially on the narrow terraces of Nepal.



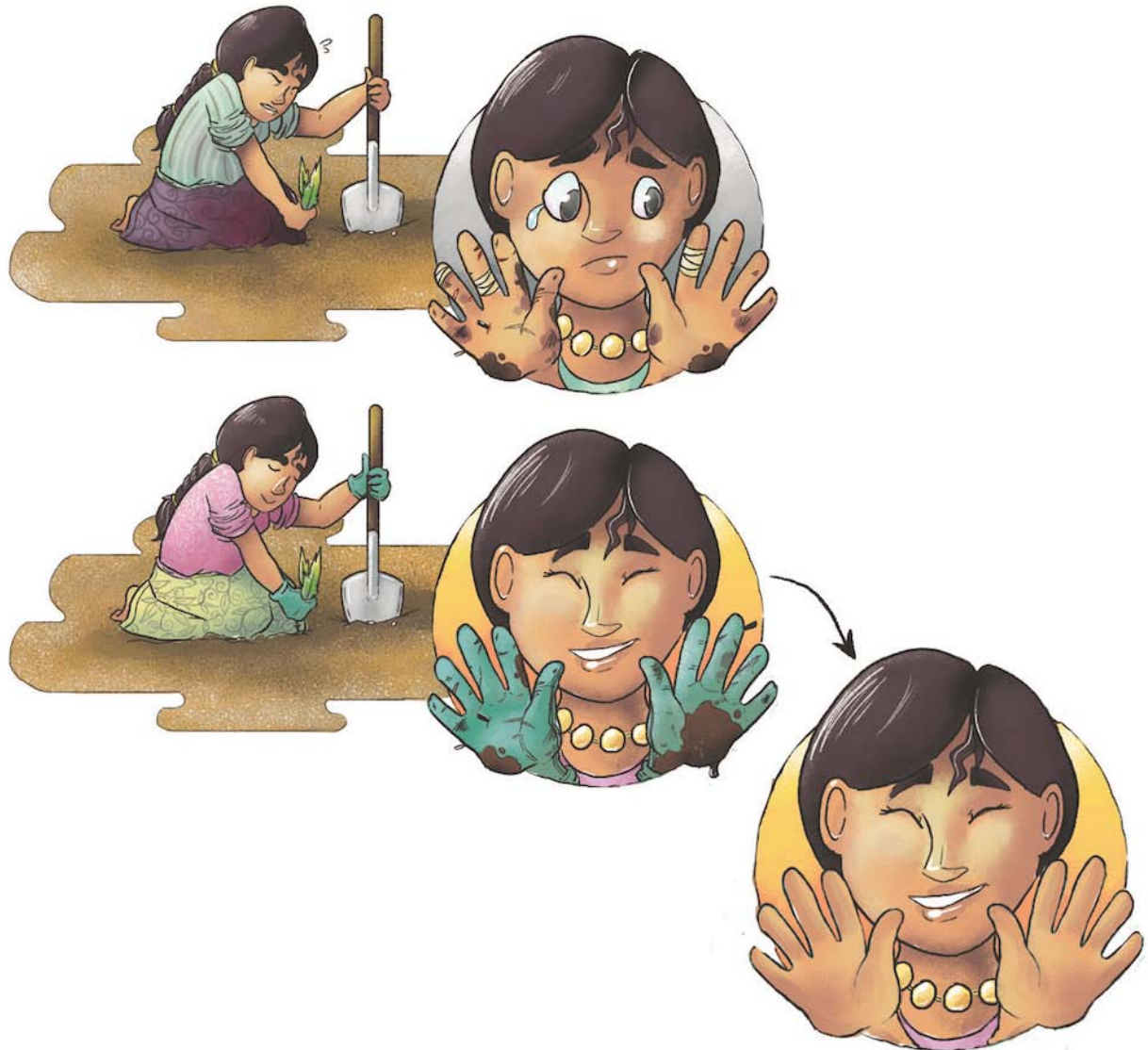
Source: Lisa Smith, SAKNepal Project Graphic Illustrator

eSAK illustration 6: A USD \$1.00 Grainpro storage bag (or Purdue Improved Cowpea Storage Bag, PICS2) prevents grain from becoming wet after a home has collapsed, and also prevents pest damage by causing oxygen to flow out, thus preventing growth of insects and molds. The bag is re-usable many times.



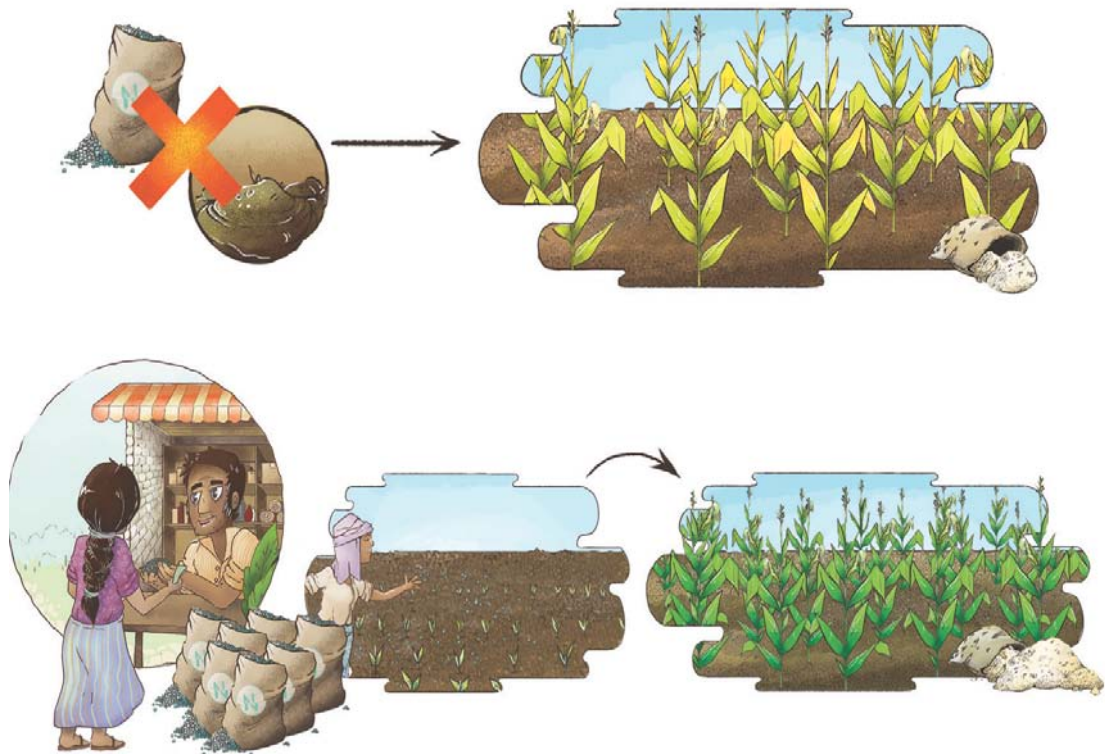
Source: Lisa Smith, SAKNepal Project Graphic Illustrator

eSAK illustration 7: Water proof gardening gloves can be multipurposed to help with debris clearing but also to reduce female hardship.



Source: Lisa Smith, SAKNepal Project Graphic Illustrator

eSAK illustration 8: A bag of nitrogen fertilizer will improve yields compared to a situation where no fertilizer or manure is added. This is a useful short-term solution. Separate lessons shows improved application methods that minimize damage to the environment and reduce farmer costs (microdosing, split application).



Source: Lisa Smith, SAKNepal Project Graphic Illustrator



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